

AMENDMENT

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) A thermal processing unit comprising:

- a holder that holds a plurality of substrates;
- a reaction container into which the holder is conveyed;
- a process-gas supplying mechanism that supplies a process gas into the reaction container;

- a heating mechanism that heats the reaction container to conduct a film-forming process to the substrates when the process gas is supplied;

- a flow-rate-parameter table-data storing part that stores flow-rate-parameter table-data associating number-data of the substrates to be processed by one batch-process with target-data of flow-rate parameter of the process gas; and

- a controlling unit that obtains target-data of flow-rate parameter of the process gas, depending on an actual number of the substrates to be processed by one batch-process, based on the flow-rate-parameter table-data stored in the flow-rate-parameter table-data storing part, and that controls the process-gas supplying mechanism according to the obtained target-data, and

- wherein the target-data of flow-rate parameter are determined in such a manner that a speed of the film-forming process is uniform among a plurality of batch-processes in which the numbers of substrates to be processed are different from each other; and

- an arrangement table-data storing part that stores arrangement table-data associating the number-data of the substrates to be processed by one batch-process with arrangement-data of the substrates on the holder is provided, and the controlling unit is adapted to obtain arrangement-data, depending on the actual number of the substrates to be processed by one batch-process, based on the arrangement table-data stored in the arrangement table-data storing part, and to cause the holder to hold the substrates according to the obtained arrangement-data; and

wherein the controlling unit further obtains a temperature target value for a central substrate among a plurality of substrates in each batch of said plurality of batch-processes as well as other temperature target values for upper and lower positioned substrates for at least some of said plurality of batch-processes, and wherein the obtained temperature value for the central substrate is not changed in value relative to the plurality of batch-processes, but other temperature target values among the upper and lower positioned substrates are changed in value from batch to batch among the batch processes in order to make more uniform the film-forming speed.

2. (Currently Amended) A thermal processing unit according to claim 1, wherein
the difference between a minimum value and a maximum value of average film-thicknesses of thin films formed on the substrates by the respective batch-processes divided by respective processing times is 0.05 nm/min or less.
3. (Original) A thermal processing unit according to claim 1 or 2, wherein
the flow-rate parameter is a flow rate of the process gas.
4. (Original) A thermal processing unit according to claim 1 or 2, wherein
the process-gas supplying mechanism is adapted to supply a plurality of kinds of process gases into the reaction container; and
the flow-rate parameter is at least one of a total flow rate and a proportion of flow rates of the plurality of kinds of process gases.
5. (Previously Presented) A thermal processing unit according to claim 1 or 2, wherein
the flow-rate-parameter table-data are made based on experimental data showing relationship between the number-data of the substrates to be processed by one batch-process and the target-data of flow-rate parameter of the process gas.

6. (Original) A thermal processing unit according to claim 5, wherein

the flow-rate-parameter table-data are made by interpolating the experimental data showing relationship between the number-data of the substrates to be processed by one batch-process and the target-data of flow-rate parameter of the process gas.

7. (Previously presented) A thermal processing unit according to claim 1 or 2, wherein

the heating mechanism has a plurality of heating units which correspond to a plurality of zones in the processing container;

a temperature table-data storing part that stores temperature table-data associating the number-data of the substrates to be processed by one batch-process with target-data of temperature of the respective zones is provided; and

the controlling part is adapted to obtain target-data of temperature of the respective zones, depending on the actual number of the substrates to be processed by one batch-process, based on the temperature table-data stored in the temperature table-data storing part, and to control the heating units according to the obtained target-data.

8. (Canceled)

9. (Previously Presented) A thermal processing unit according to claim 1 or 2, further comprising

an adjusting unit that adjusts a flow rate of the process gas based on both the film-forming speed and a change of the film-forming speed per unit flow rate of the process gas, when the film-forming speed is out of a predetermined allowable range.

10. (Currently Amended) A thermal processing method using a thermal processing unit including:

a holder that holds a plurality of substrates;

a reaction container into which the holder is conveyed;

a process-gas supplying mechanism that supplies a process gas into the reaction container; and

a heating mechanism that heats the reaction container to conduct a film-forming process to the substrates when the process gas is supplied;

the thermal processing method comprising:

a step of obtaining target-data of flow-rate parameter of the process gas, depending on an actual number of the substrates to be processed by one batch-process, based on flow-rate-parameter table-data associating number-data of the substrates to be processed by one batch-process with target-data of flow-rate parameter of the process gas; and

a step of controlling the process-gas supplying mechanism according to the obtained target-data of flow-rate parameter of the process gas;

wherein the target-data of flow-rate parameter are determined in such a manner that a speed of the film-forming process is uniform among a plurality of batch-processes in which the numbers of substrates to be processed are different from each other; and

wherein the controlling unit further obtains a temperature target value for a central substrate among a plurality of substrates in each batch of said plurality of batch-processes as well as other temperature target values for upper and lower positioned substrates for at least some batches in said plurality of batch-processes, and wherein the obtained temperature value for the central substrate is not changed in value relative to the plurality of batch-processes, but other temperature target values among the upper and lower positioned substrates are changed in value from batch to batch among the batch processes in order to make more uniform the film-forming speed.

11. (Currently Amended) A thermal processing method according to claim 10, wherein

the difference between a minimum value and a maximum value of average film-thicknesses of thin films formed on the substrates by the respective batch-processes divided by respective processing times is 0.05 nm/min or less.

12. (Original) A thermal processing method according to claim 10 or 11, wherein

the heating mechanism has a plurality of heating units which correspond to a plurality of zones in the processing container,

the thermal processing method further comprises:

a step of obtaining target-data of temperature of the respective zones, depending on the actual number of the substrates to be processed by one batch-process, based on temperature table-data associating the number-data of the substrates to be processed by one batch-process with target-data of temperature of the respective zones; and

a step of controlling the heating units according to the obtained target-data of temperature of the respective zones.